

PATENT COOPERATION TREATY

PCT



INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 14 OCT 2005

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| Applicant's or agent's file reference XA1762 | | FOR FURTHER ACTION See Form PCT/PEA/416 | |
| International application No. PCT/GB2004/004248 | International filing date (day/month/year) 07.10.2004 | Priority date (day/month/year) 10.10.2003 | |
| International Patent Classification (IPC) or national classification and IPC G06F17/60, G06T17/00 | | | |
| Applicant BAE SYSTEMS PLC et al | | | |
| <p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 9 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> sent to the applicant and to the International Bureau a total of sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p> | | | |
| <p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input checked="" type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p> | | | |
| Date of submission of the demand 10.08.2005 | | Date of completion of this report 13.10.2005 | |
| Name and mailing address of the International preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 | | Authorized Officer Rockinger, O Telephone No. +49 89 2399-2998  | |

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Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-26 as originally filed

Claims, Numbers

1-14 as originally filed

Drawings, Sheets

1/23-23/23 as originally filed

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

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Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:
- ☐ the entire international application,
 - ☒ claims Nos. 10,14
because:
 - ☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):
 - ☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):
 - ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
 - ☒ no international search report has been established for the said claims Nos. 10,14
 - ☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:
 - the written form ☐ has not been furnished
 - ☐ does not comply with the standard
 - the computer readable form ☐ has not been furnished
 - ☐ does not comply with the standard
 - ☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.
 - ☐ See separate sheet for further details

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-------------|-------------|
| Novelty (N) | Yes: Claims | 6,8,9 |
| | No: Claims | 1-5,7,11-13 |
| Inventive step (IS) | Yes: Claims | 8 |
| | No: Claims | 1-7,9,11-13 |
| Industrial applicability (IA) | Yes: Claims | 1-9,11-13 |
| | No: Claims | - |

2. Citations and explanations (Rule 70.7):

see separate sheet

Re Item III.

1. No meaningful search could be performed with respect to current independent **claims 10 and 14** because these claims contain references to *i)* the whole description and *ii)* the complete set of drawings, respectively (Rule 6.2 PCT).
2. As a consequence, these claims could not be examined with respect to the requirements of Article 33 PCT.

Re Item V.

3. The current application does not comply with the PCT as it comprises subject-matter excluded from patentability under Rules 39 and 67 PCT.
4. The current application does not comply with the requirements of Article 6 PCT because the current set of claims is **not clear** and concise.
5. The present application does not meet the requirements of 33 PCT, because the subject-matter of **claims 1 - 5, 7 and 11 - 13 not new** (Article 33(2) PCT) and the subject-matter of **claims 6 and 9 is not inventive** (Article 33(3) PCT).

CITED PRIOR ART

6. Reference is made to the documents of the International Search Report in their respective order of citation.

SUBJECT-MATTER EXCLUDED FROM PATENTABILITY

7. Current **claims 1 - 8 and 10 - 12** comprise subject-matter excluded from patentability under Rules 39.1(i) and 67.1(i) PCT as the subject-matter of these claims – considered as a whole – bears no technical character.
8. These claims refer to a mere **mathematical method** but fail relate this method to any physical entity, so that the subject-matter of these claims is to be considered to be a mathematical method **as such** – i.e. not providing any technical effect – which is excluded from patentability (Rules 39.1(i) and 67.1(i) PCT).

9. In their letter of 10.08.2005, the applicants argued that "...the subject matter of the claims [...] provides a definite technical contribution over the art insofar the subject matter addresses various technical problems associated with known processes (refer to pages 1 to 5 of the original description of the present application, for example)".
10. However, such an "addressing [of] various technical problems associated with known processes" mentioned in the description is not sufficient to render a pure mathematical method (such as the claimed method of transforming data from a high-dimensional to low-dimensional design space) technical (cf. also the PCT International Search and Preliminary Examination Guidelines, 9.5).
11. On the contrary, in order to meet the requirements of the PCT, the ***claimed*** subject-matter (and not only subject-matter specified in the description) must solve a ***technical problem*** in a ***novel*** and ***non-obvious*** way.
12. In the light of the description, it might have been possible to overcome this objection by limiting the ***claimed*** subject-matter to the specific application of an aerodynamic surface design by using a data processing system as detailed on pages 11 - 12 of the current description¹.

LACK OF CLARITY AND CONCISENESS (ARTICLE 6 PCT)

13. Although **claims 1, 2 and 10** have been drafted as separate independent claims in the same category, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought. The aforementioned claims therefore lack conciseness within the meaning of Article 6 PCT.
14. In order to overcome this objection, it would have been appropriate to file an amended set of claims defining the relevant subject-matter in terms of a single independent claim in each category followed by dependent claims covering features which are merely optional.

¹ the mere reference to an aircraft or aerodynamic surface design (as specified in current claim 9) is not sufficient to overcome this objection – because this specification could also refer to the mere colouring of the surface which would then be regarded as an aesthetical creation.

15. Article 6 PCT and the require that a claim should, as far as possible, be clear from the wording of the claim alone. However, this requirement is not met in the following cases:
- ▶ the term "*inspection*" – used in **claims 1 and 2** – does not appear to be adequate because it is not clear if this term refers to a human interaction or to an automatic processing (such as a function evaluation);
 - ▶ furthermore, the meaning of the term "*conditional value*" – used in **claim 2** – is not clear in the given context;
 - ▶ the same objection applies to the expression "... a *conditional high or low value* in relation ..." – specified in **claim 3**;
 - ▶ the subject-matter of **claim 7** remains unclear, as the feature of "... which *takes account of the effect* of each of the design variables relating to the function ..." (specified in claim 7) appears to be already defined by feature of "... establishing a mathematical combination of a number of independent design variables and dependent design variables relating to the function ..." (specified in claim 3);
 - ▶ the dependency of current **claim 13** does not appear to be correct (this system claim should probably refer to method claims 1 - 9).

REMARK ON NOVELTY AND INVENTIVE STEP (ARTICLE 33 PCT)

16. Notwithstanding the aforementioned objections, it appears to be appropriate to briefly summarise the following preliminary findings on novelty and inventive step (as far as the claims can be understood at present):
17. Document **D1** already anticipates all the features of **claim 1** so that the subject-matter of this claim lacks novelty within the meaning of Articles 33(2) PCT.
18. This document discloses in particular (in the wording of current **claim 1**):
- ▶ A method of transforming data from a high-dimensional to low-dimensional design space (cf. **D1**, page 660, left-hand-column, first paragraph) and
 - ▶ deriving an optimum value for a predetermined function-representative of the transformed data in the low-dimensional design space (cf. **D1**, page 660, the paragraph bridging the left- and right-hand column)
 - ▶ which derivation is further effected in the low-dimensional design space in dependence upon an inspection of the transformed data (cf. **D1**, page 660, right-hand column, first five paragraphs).
19. With letter of 10.08.2005, the applicants state that "**D1** does not disclose a

method of transforming data from a high-dimensional to low-dimensional design space (as required by the claims of the present application)".

20. The examiner does not share this view. On the contrary, document **D1** describes the mapping of a function which is computationally expensive to evaluate onto a function which is easier to evaluate. The easier function (which is of lower dimensionality than the original function, cf. **D1**, page 661) is then optimized.
21. As current **claim 1** fails to clearly and precisely specify how the "inspection of the transformed data" is actually performed, the term "inspection" is to be interpreted in its broadest possible meaning – as a consequence, this interpretation also embraces the optimization as a special form of inspection. Thus, in effect, the disclosure of **D1** anticipates the entire subject-matter defined in **claim 1**.
22. The same argumentation also applies to **claim 2** which differs from claim only in the specification of "deriving a *conditional* value" – instead of "deriving a *optimum* value" as defined in claim 1 – and furthermore to current **claims 11 - 12** (directed to a program element) and **claim 13** (relating to data processing system) which essentially recite all the relevant technical features of the first claim.
23. Said document **D1** furthermore discloses the subject-matter of **claims 3 - 5 and 7** (cf. **D1**; in particular pages 660-662) so that the subject-matter of these claims does not comply with the requirements of Article 33(2) PCT.
24. The mere restriction of the method to specific dimensionalities of the high- and low-dimensional design space – as defined in **claim 6** – is merely one of several straightforward possibilities and furthermore, the application of the method to an aircraft design – as defined in **claim 9** – is already disclosed by **D2** (cf. **D2**; chapter 3). Consequently, the subject-matter of **claims 6 and 9** lacks inventive step.
25. With respect to the available prior art currently on file, it appears that the subject-matter of **claim 8**, i.e. the feature of
 - generating an *image map representation* of the transformed data [...], and visually identifying an intersecting region in the image map representation [...]which defines a solution to the technical problem of
 - enhancing the known multilevel optimization method by allowing a direct and intuitive user interaction in the optimisation process

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– if appropriately clarified (cf. sections 11-13 hereinabove) and brought in conformity with the requirements of Rules 39.1(i) and 67.1(i) PCT (cf. sections 7-10 hereinabove) – could substantially meet the requirements of Article 33 PCT.

FURTHER REMARKS

26. The closest prior art **D1** and **D2** is not identified in the description.